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THE ENGINEER OF THE
TWENTIETH CENTURY



....A TOAST....



WITH COMPLIMENTS OF

CHARLES F. SCOTT.

THE ENGINEER OF THE
TWENTIETH CENTURY

Response to a
Toast at the

TWENTY-FIFTH ANNIVERSARY
ENGINEERS' CLUB OF
PHILADELPHIA



Held at Union League
Saturday, Dec. 6, 1902

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Pennsylvania

President, American Institute of Electrical
Engineers



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THE ENGINEER OF THE TWENTIETH CENTURY

ENTLEMEN:—It is significant that the response to this toast is assigned to the representative of the Engineers' Society of Western Pennsylvania. This Society represents the engineers of Pittsburg, the city above all others pre-eminent in its industrial and engineering works in the country which is assuming the industrial supremacy of the world. The products of Pittsburg owe their inception to the inventions and designs of the engineer ; under his supervision they are manufactured ;

and in turn they become the materials which other engineers employ in the construction of buildings, railroads and power plants throughout the whole world. This is the age of steel; Pittsburg furnishes the steel. This is the age of electricity; she produces the largest dynamos. The tonnage of Pittsburg's railways exceeds that of London or Paris. The tonnage of the Pittsburg harbor, notwithstanding shallow bottoms and low bridges approximates that of the New York harbor. Industrial Pittsburg! of the engineer! by the engineer! for the engineer!—typical of the present, significant of the future! Do you ask me to portray that future? I ask you to look back fifty years to the time when the first railroad bridge across the Allegheny built

against the protest of hack drivers and sympathetic citizens brought together the track from Ohio and the track to Philadelphia ; it brought them together, but it did not join them ; for the state legislature had ordained that the gauges of the tracks should be different, in order to prevent domestic cars from wandering too far from home. Compare conditions then with those now. Note what the engineer has done since some of those present reached middle life. Who will venture to predict what we young men may see before we become old ? It is with pride that I see how my own city — Smoky City of the Keystone State, the city of engineers and of industry — is growing in influence. A week ago a Philadelphia paper quoted a multi-millionaire thus ;

“Pittsburg instead of Wall street must be considered hereafter as the potent factor in the continuation of our national prosperity.” When money rates go up in Wall street and wage rates go up in Pittsburg simultaneously, it is the industrial thermometer which most truly indicates the real prosperity. ENTER Engineer; EXIT Speculator.

It is significant also that the response to this toast is assigned to the representative of the American Institute of Electrical Engineers. This organization represents the electrical engineers of America—the country above all others pre-eminent in electrical activity—at a time when its applications are making this the Age of Electricity. For a retrospect of general engineering we appeal to the memory of men past

middle life; but the electrical awakening is within the easy memory of us all.

Electrical work is seldom independent. It does not stand alone, complete in itself. Electricity is usually an instrument, a means to an end. It is not energy derived at first hand from electricity which enables the car to move and the crane to lift a weight. It is power derived from the engine, which happily can be transmitted by electric wires better than by shafts or ropes or belts. It is because electricity is primarily an agent, a means, that its applications have been so diversified, so extensive, and so far reaching in their effects.

The telegraph, the cable, the telephone have had a profound effect

upon political, commercial and social affairs. The applications of electricity bring the evolution of new methods as well as the revolution of old ones. It is a new instrument which has given to the whole world a new method of doing things.

The electrical engineer follows the new gospel, the Gospel of Service. His mission is helpfulness. Through his aid the mining engineer lights his mine, drives his fans and pumps and drills and conveys his product. Through his aid the mechanical engineer has modernized the machine shop by the electric crane and by motor-driven tools which increase output and reduce cost. Through his aid the railway engineer has replaced the horse-car by the people's automobile, which for a few cents will carry anybody

from city to suburb more quickly than it was possible by any means at the command of even the millionaire a dozen years ago, and that, too, with the added comforts of warmth and light. Through his aid a new realm is opened to the chemist in the field of electrochemistry. Through his aid the engineer of plant life, the farmer of the West, transforms the desert into a garden by motor-driven pumps and the distant water power. Through his aid the engineer of human life is given a new sight to penetrate the living body and a new stimulus to excite the inactive muscle. Through his aid the luxuries of yesterday have become the necessities of to-day, and the impossible has become the commonplace.

The great discovery of the Nineteenth Century was CO-OPERATION, the effectiveness of concentration, the efficiency of largeness. Compare the old days of the handloom in the home, of the shoemaker at his bench, of the individual oil well and coal mine, of the small railroad and of the small factory,—compare these with modern methods, pregnant as they are with unbounded possibilities—possibilities of good and possibilities of evil ; of good, because the engineer has provided the means for doing the world's work far more efficiently ; of evil, because the social, the industrial, the commercial systems have not kept pace with the advance made by the engineer, but are still tainted with injustice and selfishness.

The tendencies of the Nineteenth Century projected into the future, reveal in dim outlines at least, the Engineer of the Twentieth Century. He is to deal with large affairs in a large way. He is to be closely related to every department of modern life. He is to become a chief factor in adjusting and operating the intricate mechanism of a new civilization. He is to advance to administrative positions for which his knowledge and his training peculiarly fit him. Note present examples. At the head of the Pennsylvania Railroad, directing its vast affairs in the present and planning to meet the demands of the future, is an engineer surrounded by engineers—President Cassatt. At the head of the interests with which I am connected is a man, successful as

organizer and manager and financier, a genius in his foresight, but first of all an engineer, George Westinghouse. Sound judgment, breadth of view, integrity of character, the ability to understand and to control men as well as matter, and to direct human forces as well as physical forces, are essential to the engineer of the future. A recent event which has aided in bringing America to pre-eminence is the victory of our Navy. A naval battle is a contest between fighting machines, and these are the products of the Engineer. All honor, then, to the Engineer, so fittingly represented here to-night by Admiral Melville.

Besides their new relations to others, there will be new relations of engineers among themselves. All that I have said so far empha-

sizes what we all know, namely, that the several branches of engineering are intimately interdependent and correlated. Take a single instance of large work, the extension of the Pennsylvania Railroad into New York City,—the tunnels under the Hudson and East Rivers, the terminal facilities and the electrical equipment—and endeavor to name an important branch of engineering which is not essential to this undertaking. The work of the future demands co-operation, not clanishness—unity, not jealousy. Engineers must be specialists, therefore they must work together. The several branches of the profession have their individual interests ; they have a larger common interest. As we marvel at what the engineer has done, as we attempt to picture what

he may accomplish, do we realize the far-reaching responsibilities which confront us? Shall we rise to meet them? We gave to the world the steam engine, the steam vessel, the railroad, the telegraph and the cable, machinery, industrial processes, the electrical central station—the fundamental requisites which underlie co-operation. Is it not time that we apply to ourselves the great lesson of the last century? What organization stands before the world as representative of the engineering profession? In what way do engineers present themselves to other professions? A noted lawyer recently addressed the annual banquet of a local engineers' society containing members of national and international reputation. His remarks were based upon the idea that all

engineers were co-ordinate with a common chainman, and they would have been positively insulting but for his air of blissful ignorance. A few years ago a gentleman of eminence, in addressing the American Society of Mechanical Engineers, advised its members not to join in a machinists' strike? Has the engineer been accorded the recognition and the reward which are his due? In what way do engineers co-operate to advance their own profession by mutual helpfulness and by undertaking measures which advance the efficiency and the usefulness of engineering work? There are national engineering organizations of various kinds,—the Civil Engineers, the Mining Engineers, the Mechanical Engineers, the Electrical Engineers, the Architects, the

Naval Architects and Marine Engineers, the engineers in the Army and the Navy, and there are the Chemists, the Electrochemists and others. In general each knows that other societies exist, and they are mutually respectful, but there is some suspicion here and there that the others are a little too exclusive or that they are a bit jealous. These are the murmurings of littleness, not of largeness.

The several engineering professions, like the constituent States, have their representative bodies, their legislatures, but why should there not be an Engineering Congress as well? Why not a national representative body, to stand for the profession of engineering as a whole, to promote a harmonious

co-operation which will strengthen each and elevate all ?

An incident of the past year is an auspicious omen. Four great societies have co-operated ; they have taken a step which will bring recognition to the deserving individual and credit to the engineering profession. They have founded a medal ; and at a recent magnificent dinner they have announced the award of the first John Fritz Medal to the venerable man who has just spoken, John Fritz himself. But not less significant than even the medal is the discovery that the societies can work together, and that by doing so they can accomplish worthy ends.

In the vision of the future may we not discern a reflection of the John Fritz Medal in the larger life

of the Twentieth Century engineer? Methinks I see in that reflection the outlines of a magnificent building, the Capitol of American Engineering. Into this home, situated in the metropolis of the Nation, are gathered the great engineering societies from their scattered lodgings. Here is a great technical library; here are ample assembly halls and comfortable parlors; here are the headquarters of a score of lesser societies, restricted in their scope, but affiliated in their work. I see all over the country innumerable local societies and engineering clubs, no longer isolated but joined together into one great combination. I see them affiliated with the national bodies of the several professions—sometimes as local chapters—altogether constituting one great union.

There is individual freedom but general co-operation. Representing all the engineering professions and supported by the great union of the national engineering societies, I see an Engineering Congress giving to engineers a rank consistent with the importance of their work, and increasing the efficiency of the inter-relations among its members. An eminent body, it is powerful in advancing the common interests of engineers, and it represents the engineering profession in its relation to other professions, to pure science, to education, to legislation, to public improvements and to the general welfare.

Years ago engineers were individuals of trivial consequence compared with men in the learned professions, Now they, too, form

a profession of recognized importance. But as yet the national societies of this profession, which has made the nineteenth century an era in the world's history, which has provided the means for the production of unmeasured wealth, and which promises yet greater things for the future, have not even adequate homes of their own. Within the present week the Society of Mechanical Engineers, which has a little house of its own, found it so very little that it was forced to hold its meetings in a large room in a nearby tavern, although there were present men through whose work hundreds of millions have been added to the wealth of this country, and their present efforts are to increase the

efficiency of the future. Is this right? Is it just?

But may not the fault lie somewhat with the engineers themselves? Have they fully recognized their own strength and importance? Have they shown a disposition to act together, to do large work in a large way? Have they given promise that they would use the enlarged facilities in such a way as to increase the efficiency of engineering work?

The men who are mastering the powers of nature will yet rise in the strength of united effort to meet the increasing responsibilities of the coming years. For it is theirs to build the foundation of the new civilization; it is theirs to establish that material prosperity which is

the underlying condition of broader, higher and fuller life.

The end of engineering is usefulness; the characteristic of America is activity; the modern method is co-operation. As Engineers of the Twentieth Century, let us be useful; let us be active; let us co-operate.

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